What is claimed is:

1. A semiconductor device comprising:

a semiconductor substrate including a low concentration layer of a first conductivity type, the semiconductor substrate having grooves formed on its surface on the low concentration layer side,

wherein the grooves include a plurality of narrow active grooves and a ring-shaped inner circumferential groove surrounding the active grooves,

bottom faces of the active grooves and a bottom face of the inner circumferential groove are provided in the low concentration layer, and

both ends of each of the active grooves are connected to the inner circumferential groove.

2. The semiconductor device according to claim 1, wherein a semiconductor filler of a second conductivity type is provided in each of the active grooves and the inner circumferential groove, and

the semiconductor filler in each of the active grooves is connected to the semiconductor filler in the inner circumferential groove.

3. The semiconductor device according to claim 1, wherein the semiconductor substrate further has a plurality of ring-

shaped guard ring grooves concentrically surrounding the inner circumferential groove.

4. The semiconductor device according to claim 3, wherein the semiconductor filler is provided in each of the guard ring grooves.

5. The semiconductor device according to claim 1, wherein the low concentration layer has a surface of a plane orientation of {100},

the inner circumferential groove is formed in a quadrangular ring shape,

each of the active grooves is provided in a parallel direction to two parallel sides among four sides of the inner circumferential groove, and

the {100} plane of crystal of the semiconductor substrate is exposed on a side face and a bottom face inside each of the active grooves and on a side face and a bottom face inside the inner circumferential groove.

6. The semiconductor device according to claim 2 further comprising:

the semiconductor substrate including gate grooves, each being formed by removing an upper portion of the semiconductor filler in each of the active grooves,

remaining portions corresponding lower portions of the semiconductor fillers, situated at lower portions of the gate grooves;

a gate insulating film provided at least on a side face of each of the gate grooves;

gate electrode plugs provided in contact with the gate insulating film in the gate grooves, being insulated from the remaining portions of the semiconductor fillers;

a base region of a second conductivity type provided on a surface side inside the low concentration layer at a position in contact with the gate insulating film; and

a source region of a first conductivity type provided at a position on a surface side inside the base region so as to be separated from the low concentration layer and to be in contact with the gate insulating film,

wherein, when a voltage is applied to the gate electrode plugs to form an inversion layer of the first conductivity type in a portion of the base region in contact with the gate insulating film, the source region and the low concentration layer are connected to each other through the inversion layer.

7. The semiconductor device according to claim 6, wherein a height of the semiconductor filler provided in the inner circumferential groove is higher than that of the remaining portions of the semiconductor fillers in the active grooves.

8. The semiconductor device according to claim 6, wherein the semiconductor substrate includes a drain layer of the first conductivity type, having a higher concentration than the low concentration layer, and

a drain electrode film forming an ohmic junction with the drain layer is provided on the drain layer.

9. The semiconductor device according to claim 6, wherein the semiconductor substrate includes a collector layer of the second conductivity type, forming a PN junction with the low concentration layer, and

a collector electrode film forming an ohmic junction with the collector layer is formed on the collector layer.

10. The semiconductor device according to claim 6, wherein a Schottky electrode film forming a Schottky junction with the low concentration layer is provided on a surface of the low concentration layer.

11. The semiconductor device according to claim 2, wherein a Schottky electrode forming ohmic junctions with the semiconductor fillers and a Schottky junction with the low concentration layer is provided on surfaces of the semiconductor fillers provided in the active grooves and on

surfaces of parts of the low concentration layer situated between the active grooves, in a region surrounded by the inner circumferential groove.